

WHAT IS CLAIMED IS:

1. In a system for exposing at least one wafer to a treatment process in a treatment chamber at a treatment pressure, said wafer including a frontside that is to be exposed to the treatment process and an opposing, backside, said system including at least one support arrangement for supporting said wafer in the treatment chamber such that said backside of the wafer is exposed to a heat transfer gas for thermally coupling the wafer to the support arrangement, a configuration for controlling said heat transfer gas, said configuration comprising:

a first arrangement for providing a fixed flow of said heat transfer gas;

a second arrangement for routing said heat transfer gas from said first arrangement to said support arrangement so as to provide said thermal coupling with the support arrangement having the heat transfer gas at a backside pressure that is greater than said treatment pressure such that a first portion of the heat transfer gas leaks between the support arrangement and the wafer into the treatment chamber;

a third arrangement for sensing said backside pressure to produce a pressure signal; and

a fourth arrangement in flow communication with said second arrangement for controllably releasing a second portion of said fixed flow responsive to said pressure signal in a way which maintains said backside pressure at a selected value.

2. The configuration of claim 1 including an arrangement cooperating with said fourth arrangement to permit a user to select said selected value of the backside pressure from a backside pressure range.

3. The configuration of claim 1 wherein said fourth arrangement includes a low pressure drop mass flow controller for releasing said second portion of the fixed flow.

4. The configuration of claim 1 wherein said fourth arrangement is arranged to release said second portion of the fixed flow into said treatment chamber such that, at any given time, said fixed flow enters the treatment chamber as a combination of said first portion and said second portion.

5. The configuration of claim 4 wherein said fourth arrangement releases the second portion of said fixed flow into the treatment chamber in a way which provides a relatively constant dilution of the heat transfer gas proximate to the wafer with changes in a leak rate of the heat transfer gas between the support arrangement and the wafer.

6. The configuration of claim 1 wherein said wafer is located in a wafer plane within the treatment chamber and wherein said fourth arrangement introduces the second portion of the heat transfer gas in one or more directions that are at least generally parallel to the wafer plane.

7. The configuration of claim 6 wherein said fourth arrangement introduces said second portion of the heat transfer gas at least approximately into said wafer plane.

8. In a system for exposing at least one wafer to a treatment process in a treatment chamber at a treatment pressure, said wafer including a frontside that is to be exposed to the treatment process and an opposing, backside, said system including at least one support arrangement for supporting said wafer in the treatment chamber such that said

backside of the wafer is exposed to a heat transfer gas for thermally coupling the wafer to the support arrangement, a method comprising:

- providing a fixed flow of said heat transfer gas;

- routing said heat transfer gas to said support arrangement so as to provide said thermal coupling with the support arrangement having the heat transfer gas at a backside pressure that is greater than said treatment pressure such that a first portion of the heat transfer gas leaks between the support arrangement and the wafer into the treatment chamber;

- sensing said backside pressure to produce a pressure signal; and

- controllably releasing a second portion of said fixed flow, responsive to said pressure signal, in a way which maintains said backside pressure at a selected value.

9. The method of claim 8 including user selection of said selected value of the backside pressure from a backside pressure range.

10. The method of claim 8 wherein controllably releasing includes using a low pressure mass flow controller for releasing said second portion of the fixed flow.

11. The method of claim 8 wherein controllably releasing causes said second portion of the fixed flow to enter said treatment chamber, at any given time, as a combination of said first portion and said second portion.

12. The method of claim 11 wherein controllably releasing the second portion of said fixed flow into the treatment chamber causes a relatively constant dilution of the heat transfer gas proximate to the wafer with changes in a leak rate of the heat transfer gas between the support arrangement and the wafer.

13. The method of claim 8 wherein said wafer is located in a wafer plane within the treatment chamber and wherein controllably releasing includes introducing the second portion of the heat transfer gas in one or more directions that are at least generally parallel to the wafer plane.

14. The method of claim 13 wherein introducing the second portion of the heat transfer gas causes the second portion of the heat transfer gas to flow into the treatment chamber at least approximately into said wafer plane.

15. In a system for exposing at least one of a first wafer and a second wafer present in a treatment chamber to a treatment environment that is shared when both wafers are present, each wafer including a frontside and an opposing, backside, said system including a first support arrangement for supporting the first wafer and a second support arrangement for supporting the second wafer in a way which exposes the backside of each wafer that is present to a heat transfer gas for thermally coupling the first wafer to the first support arrangement and for thermally coupling the second wafer to the second support arrangement, a configuration for controlling said heat transfer gas, said configuration comprising:

- a first arrangement for providing a fixed flow of said heat transfer gas;

- a second arrangement for selectively routing said heat transfer gas from said first arrangement to at least one of said first and second support arrangements so as to selectively provide said thermal coupling between each support arrangement and each wafer that is present, with the heat transfer gas at a backside pressure which is available to both of

the support arrangements and which is greater than said treatment pressure such that a first portion of the heat transfer gas leaks between the first support arrangement and the first wafer into the treatment chamber at a first leak rate, when the first wafer is present, and a second portion of the heat transfer gas leaks between the second support arrangement and the second wafer into the treatment chamber at a second leak rate, when the second wafer is present;

a third arrangement for sensing said backside pressure to produce a pressure signal; and

a fourth arrangement in flow communication with said second arrangement for controllably releasing a third portion of said fixed flow into said treatment chamber responsive to said pressure signal in a way which maintains said backside pressure at a selected value such that, at any given time, said fixed flow enters the treatment chamber as said third portion in combination with at least one of said first portion and said second portion.

16. The configuration of claim 15 including an arrangement cooperating with said fourth arrangement to permit a user to select said selected value of the backside pressure from a backside pressure range.

17. The configuration of claim 15 wherein said second arrangement includes a configuration for preventing said heat transfer gas from reaching at least one of the first and second support arrangements such that a single wafer can be treated and said fourth arrangement cooperates with said second arrangement to maintain said backside pressure at the selected value by diverting one of said first and second portions of the heat transfer gas to said third portion.

18. The configuration of claim 15 wherein said fourth arrangement is configured for releasing said third portion of the heat transfer gas into the treatment chamber in a way which causes a constant dilution of said heat transfer gas, at least to an approximation, proximate to one wafer frontside when only one of the first and second wafers is present in the treatment chamber and proximate to both wafer frontside when both of the first and second wafers are present in the treatment chamber.

19. The configuration of claim 15 wherein said support arrangements are configured to support either of the first and second wafer present in the treatment chamber in a wafer plane and wherein said fourth arrangement introduces the second portion of the heat transfer gas in one or more directions that are at least generally parallel to the wafer plane.

20. The configuration of claim 19 wherein said fourth arrangement introduces said second portion of the heat transfer gas at least approximately into said wafer plane.

21. The configuration of claim 15 wherein the first leak rate of the first wafer is different from the second leak rate of the second wafer and said fourth arrangement cooperates with the third arrangement to maintain said backside pressure at the selected value when the first and second wafers exhibit different leak rates.

22. In a system for exposing at least one of a first wafer and a second wafer present in a treatment chamber to a treatment environment that is shared when both wafers are present, each wafer including a frontside and an opposing, backside, said system including a first support arrangement for supporting the first wafer and a second support arrangement for supporting the second wafer in a way which exposes the backside of each wafer that is present to a heat transfer gas for thermally coupling the first wafer to the first support arrangement and for thermally coupling the second wafer to the second support arrangement, a configuration for controlling said heat transfer gas, a method comprising:

providing a fixed flow of said heat transfer gas;

selectively routing said heat transfer gas from said first arrangement to at least one of said first and second support arrangements so as to selectively provide said thermal coupling between each support arrangement and each wafer that is present, with the heat transfer gas at a backside pressure which is available to both of the support arrangements and which is greater than said treatment pressure such that a first portion of the heat transfer gas leaks between the first support arrangement and the first wafer into the treatment chamber at a first leak rate, when the first wafer is present, and a second portion of the heat transfer gas leaks between the second support arrangement and the second wafer into the treatment chamber at a second leak rate, when the second wafer is present;

sensing said backside pressure to produce a pressure signal; and

controllably releasing a third portion of said fixed flow into said treatment chamber responsive to said pressure signal in a way which maintains said backside pressure at a selected value such that, at any given time, said fixed flow enters the treatment chamber as said third portion in combination with at least one of said first portion and said second portion.

23. The method of claim 22 including a user selection of selected value for the backside pressure that is selected from within a backside pressure range.

24. The method of claim 22 including preventing said heat transfer gas from reaching at least one of the first and second support arrangements such that a single wafer can be treated and diverting a corresponding one of said first and second portions of the heat transfer gas to said third portion.

25. The method of claim 22 wherein controllably releasing includes releasing said third portion of the heat transfer gas into the treatment chamber in a way which causes a constant dilution of said heat transfer gas, at least to an approximation, proximate to one wafer frontside when only one of the first and second wafers is present in the treatment chamber and proximate to both wafer frontside, when both of the first and second wafers are present in the treatment chamber.

26. The method of claim 22 wherein said support arrangements are configured to support either of the first and second wafer present in the treatment chamber in a wafer plane and wherein controllably releasing introduces the second portion of the heat transfer gas in one or more directions that are at least generally parallel to the wafer plane.

27. The method of claim 26 wherein said second portion of the heat transfer gas is introduced at least approximately into said wafer plane.

28. The method of claim 22 wherein the first leak rate of the first wafer is different from the second leak rate of the second wafer and said controllably releasing responds to said pressure signal to maintain said backside pressure at the selected value when the first and second wafers exhibit different leak rates.

29. In a system for exposing a series of wafers to a treatment process in a treatment chamber at a treatment pressure, each wafer including a frontside that is to be exposed to the treatment process and an opposing, backside, said system including at least one support arrangement for supporting one of the wafers in the treatment chamber such that

said backside of a supported wafer is exposed to a heat transfer gas for thermally coupling the supported wafer to the support arrangement and so that a first portion of the heat transfer gas leaks between the support arrangement and the supported wafer into said treatment chamber at a leakage rate that is variable, as associated with each one of the series of wafers, a configuration for controlling said heat transfer gas, said configuration comprising:

- a first arrangement for providing a fixed flow of said heat transfer gas for use by the support arrangement;

- a second arrangement for routing said heat transfer gas from said first arrangement to said support arrangement so as to provide said thermal coupling with the support arrangement having the heat transfer gas at a backside pressure that is greater than said treatment pressure such that said first portion of the heat transfer gas leaks between the support arrangement and the supported wafer into the treatment chamber; and

- a third arrangement for introducing a second portion of the heat transfer gas into the treatment chamber, which second portion is a difference between the fixed flow and said first portion of the fixed flow, in a way which approximates all of said fixed flow leaking between the support arrangement and the wafer so as to provide an approximately fixed dilution of the heat transfer gas proximate to the frontside of the wafer, irrespective of a particular leak rate that is associated with the supported wafer.

30. The configuration of claim 29 wherein said wafer is located in a wafer plane within the treatment chamber and wherein said third arrangement introduces the second portion of the heat transfer gas in one or more directions that are at least generally parallel to the wafer plane.

31. The configuration of claim 30 wherein said third arrangement introduces said second portion of the heat transfer gas at least approximately into said wafer plane.

32. The configuration of claim 29 including an arrangement cooperating with said third arrangement to permit a user to electrically set a selected value of the backside pressure as any value within a backside pressure range.

33. In a system for exposing a series of wafers to a treatment process in a treatment chamber at a treatment pressure, each wafer including a frontside that is to be exposed to the treatment process and an opposing, backside, said system including at least one support arrangement for supporting one of the wafers in the treatment chamber such that said backside of a supported wafer is exposed to a heat transfer gas for thermally coupling the supported wafer to the support arrangement and so that a first portion of the heat transfer gas leaks between the support arrangement and the supported wafer into said treatment chamber at a leakage rate that is variable, as associated with each one of the series of wafers, a method comprising:

- providing a fixed flow of said heat transfer gas for use by the support arrangement;

- routing said fixed flow of heat transfer gas from said support arrangement so as to provide said thermal coupling with the support arrangement having the heat transfer gas at a backside pressure that is greater than said treatment pressure such that said first portion of the heat transfer gas leaks between the support arrangement and the supported wafer into the treatment chamber; and

- introducing a second portion of the heat transfer gas into the treatment chamber, which second portion is a difference between the fixed flow and said first portion of the fixed flow, in a way which approximates all of said fixed flow leaking between the support arrangement and the wafer so as to provide an approximately fixed dilution of the heat

transfer gas proximate to the frontside of the wafer, irrespective of a particular leak rate that is associated with the supported wafer.

34. The method of claim 33 wherein said wafer is located in a wafer plane within the treatment chamber and wherein introducing causes the second portion of the heat transfer gas to flow in one or more directions that are at least generally parallel to the wafer plane.

35. The method of claim 34 wherein introducing said second portion of the heat transfer gas further causes the second portion to flow at least approximately into said wafer plane.

36. The method of claim 33 including electrically setting a selected value for the backside pressure which is selected by a user from a backside pressure range.

37. In a system for simultaneously exposing at least two wafers to a treatment process in a treatment chamber at a treatment pressure, each wafer including a frontside that is to be exposed to the treatment process and an opposing, backside, said system including at least two support arrangements, each for supporting one of the wafers in the treatment chamber such that said backside of supported ones of the wafers are exposed to a heat transfer gas for thermally coupling each supported wafer to its support arrangement and so that a first portion of the heat transfer gas leaks between the support arrangements and the supported wafers into said treatment chamber based on a leakage rate that is a variable for each one of the supported wafers, a configuration for controlling said heat transfer gas, said configuration comprising:

a first arrangement for providing a fixed flow of said heat transfer gas for use by the support arrangements;

a second arrangement for routing said heat transfer gas from said first arrangement to said support arrangements so as to provide said thermal coupling between each support arrangement and its supported wafer, having the heat transfer gas at a backside pressure that is greater than said treatment pressure such that said first portion of the heat transfer gas leaks between the support arrangements and the supported wafers into the treatment chamber; and

a third arrangement for introducing a second portion of the heat transfer gas into the treatment chamber, which second portion is a difference between the fixed flow and said first portion of the fixed flow, in a way which approximates all of said fixed flow leaking between the support arrangements and the wafers, proximate thereto, so as to provide an approximately fixed dilution of the heat transfer gas proximate to the frontside of the wafers, irrespective of a particular leak rate that is associated with each of the supported wafers.

38. The configuration of claim 37 wherein said third arrangement is arranged to divide said second portion at least approximately into equal parts and for injecting one of the equal parts into the treatment chamber proximate to each support arrangement.

39. The configuration of claim 37 wherein said wafers are located in a wafer plane within the treatment chamber and wherein said third arrangement introduces the second portion of the heat transfer gas in one or more directions that are at least generally parallel to the wafer plane.

40. The configuration of claim 37 wherein said third arrangement introduces said second portion of the heat transfer gas at least approximately into said wafer plane.

41. The configuration of claim 37 including an arrangement cooperating with said third arrangement to permit a user to electrically set said selected value of the backside pressure as any value within a backside pressure range.

42. In a system for simultaneously exposing at least two wafers to a treatment process in a treatment chamber at a treatment pressure, each wafer including a frontside that is to be exposed to the treatment process and an opposing, backside, said system including at least two support arrangements, each for supporting one of the wafers in the treatment chamber such that said backside of supported ones of the wafers are exposed to a heat transfer gas for thermally coupling each supported wafer to its support arrangement and so that a first portion of the heat transfer gas leaks between the support arrangements and the supported wafers into said treatment chamber based on a leakage rate that is a variable for each one of the supported wafers, a configuration for controlling said heat transfer gas, a method comprising:

providing a fixed flow of said heat transfer gas for use by the support arrangements;

routing said heat transfer gas from to said support arrangements so as to provide said thermal coupling between each support arrangement and its supported wafer, having the heat transfer gas at a backside pressure that is greater than said treatment pressure such that said first portion of the heat transfer gas leaks between the support arrangements and the supported wafers into the treatment chamber; and

introducing a second portion of the heat transfer gas into the treatment chamber, which second portion is a difference between the fixed flow and said first portion of the fixed flow, in a way which approximates all of said fixed flow leaking between the support arrangements and the wafers, proximate thereto, so as to provide an approximately fixed dilution of the heat transfer gas proximate to the frontside of the wafers, irrespective of a particular leak rate that is associated with each of the supported wafers.

43. The method of claim 42 wherein introducing includes dividing said second portion at least approximately into equal parts and for injecting one of the equal parts into the treatment chamber proximate to each support arrangement.

44. The method of claim 42 wherein said wafers are located in a wafer plane within the treatment chamber and wherein introducing injects the heat transfer gas in one or more directions that are at least generally parallel to the wafer plane.

45. The method of claim 42 wherein introducing further injects said second portion of the heat transfer gas at least approximately into said wafer plane.

46. The method of claim 42 including electrically setting a selected value for the backside pressure which is selected by a user from a backside pressure range.